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EXAMINER	
STOFFREGEN, JOEL	

ART UNIT	PAPER NUMBER
2626	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/813,472

Applicant(s)

PRIETO ET AL.

Examiner

Joel Stoffregen

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-9, 11, 20, 25, 29, 31 and 33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-9, 11, 20, 25, 29, 31 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/ are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Amendment

2. This communication is in response to applicant's amendment dated October 31, 2007. The applicant amended claims 3-9, 11, 20, 25, 29, 31, and 33, and cancelled claims 1, 2, 12-19, 22-24, 27, and 28. Claims 3-9, 11, 20, 25, 29, 31, and 33 are currently pending in this application. The previous objection to the claims has been withdrawn because the applicant amended the corresponding claims.

Response to Arguments

3. Applicant's arguments filed October 31, 2007 have been fully considered but they are not persuasive.

The applicant argued that Ono (5,883,978) does not teach "reducing the amount of down sampled data only from second and higher levels of wavelet decomposition" (see p. 7 of applicant's remarks). However, Ono performs prediction on the intermediate and upper subbands (see column 7, lines 23-35). The subbands are directly connected to the level of wavelet decomposition (see column 7, lines 23-35). The prediction described by Ono is the same as that shown in FIG. 11 of the applicant's disclosure. This prediction reduces the amount of data needed to represent the intermediate and upper subbands (see column 2, lines 65-67). The DC and lower frequency components

do not undergo prediction and thus their data rate is not reduced (see column 7, lines 51-61). Therefore Ono does teach that the amount of data is reduced for only the second and higher levels of wavelet decomposition.

The applicant further argued that Vaidyanathan (Multirate Systems and Filterbanks) does not teach the claimed predictor (see p. 10 of applicant's remarks). However, Vaidyanathan was not relied upon to teach the predictor. Vaidyanathan merely shows the properties of decimation. The function that is performed before or after the decimation (prediction or filtering) is not relevant. Therefore Vaidyanathan does teach the claimed methods of decimation.

Claim Rejections - 35 USC § 102

4. **Claims 3-7 and 20** are rejected under 35 U.S.C. 102(b) as being anticipated by Ono, Patent No.: US 5,883,978 ("ONO").

5. Regarding **claim 20**, ONO teaches an encoder for encoding an input data signal comprising:

a multi-level analysis filter bank for decorrelating an input data signal (see FIG. 14, a filter bank for wavelet conversion);

a plurality of decimators for down sampling the filtered input data signal (see FIG. 14, column 1, lines 51-53, the down arrows down sample the data);

a predictor to extract cross-subband dependence from the down sampled signal (“subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband”, column 6, lines 35-37); and

a compressor including a quantizer (see FIG. 2, step 5-4) and coder (see FIG. 2, step 5-5) for reducing the amount of down sampled data only from second and higher levels of wavelet decomposition (“subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband”, column 6, lines 35-37).

6. Regarding **claim 3**, ONO further teaches that the input data signal is two-dimensional (see FIG. 14, “input image data”).

7. Regarding **claim 4**, ONO further teaches that the predictor extracts higher frequency subbands that result from a first-level two-dimensional decomposition performed by the analysis filter bank from subbands obtained from higher levels of a two-dimensional decomposition performed by the analysis bank (“subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband”, column 6, lines 35-37, see FIG. 5).

8. Regarding **claim 5**, ONO further teaches that the two-dimensional decomposition is performed along one dimension first by processing the multi-level analysis filter bank as a separable transform (see FIG. 14, horizontal filtering is performed first).

9. Regarding **claim 6**, ONO further teaches that full decimation is performed prior to the predictor that extracts cross-subband dependence (see FIG. 2, full decimation occurs in the "Wavelet Conversion" step [see FIG. 14], which occurs before prediction).

10. Regarding **claim 7**, ONO further teaches that full decimation is performed prior to a predictor that extracts cross-subband dependence (see FIG. 2, full decimation occurs in the "Wavelet Conversion" step [see FIG. 14], which occurs before prediction).

Claim Rejections - 35 USC § 103

11. **Claims 21-27, 29, 30, and 33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono, Patent No.: US 5,883,978 ("ONO").

12. Regarding **claim 21**, ONO teaches all of the claimed limitations of claim 20.

However, ONO does not specifically disclose that the output of the compressor is transmitted to a receiver for decoding the compressed data signal.

An official notice is taken (see MPEP 2144.03) that the feature of transmitting the output of the compressor to a receiver for decoding the compressed data signal is well-known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify ONO to transmit the encoded data to a decoder in order to obtain decoded data.

13. Regarding **claim 25**, ONO teaches an encoder that mirrors the decoder of claim 25. An official notice is taken (see MPEP 2144.03) that it is well-known in the art to decode a signal by performing the opposite steps used to encode the signal, wherein the decoder comprises:

a de-compressor including an inverse quantizer (see FIG. 2, step 5-4, quantizing mirrors an inverse quantizer) and inverse coder (see FIG. 2, step 5-5, coding mirrors an inverse coder) for expanding the compressed data signal;

a plurality of interpolators for upsampling the de-compressed data signal (see FIG. 14, column 1, lines 51-53, the down arrows down sample the data which mirrors a plurality of interpolators);

a multilevel synthesis filter bank for performing an inverse wavelet transformation filter bank on the upsampled data (see FIG. 14, a filter bank for wavelet conversion mirrors an inverse wavelet filter bank); and

a predictor for extracting higher-frequency subbands corresponding to a first-level decomposition of an analysis wavelet filter bank ("subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband", column 6, lines 35-37).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify ONO to decode the signal by reversing the steps used to encode the signal in order to obtain decoded data.

14. Regarding **claim 26**, ONO teaches all of the claimed limitations of claim 25.

However, ONO does not specifically disclose a means for conveying the recovered data signal.

An official notice is taken (see MPEP 2144.03) that the feature of conveying the recovered data signal is well-known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify ONO to convey the recovered data signal in order for a user to experience the data.

15. Regarding **claim 29**, ONO teaches an encoder that mirrors the decoder of claim 29. An official notice is taken (see MPEP 2144.03) that it is well-known in the art to decode a signal by performing the opposite steps used to encode the signal, wherein the decoder comprises:

- a de-compressor including an inverse quantizer (see FIG. 2, step 5-4, quantizing mirrors an inverse quantizer) and inverse coder (see FIG. 2, step 5-5, coding mirrors an inverse coder) for expanding the compressed data signal;

- a plurality of full interpolators for upsampling the de-compressed data signal prior synthesis filtering (see FIG. 14, column 1, lines 51-53, the down arrows down sample the data which mirrors a plurality of interpolators);

- a multilevel synthesis filter bank for performing an inverse wavelet transformation filter bank on the upsampled data signal (see FIG. 14, a filter bank for wavelet conversion mirrors an inverse wavelet filter bank); and

a predictor for extracting cross-subband correlations ("subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband", column 6, lines 35-37).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify ONO to decode the signal by reversing the steps used to encode the signal in order to obtain decoded data.

16. Regarding **claim 30**, ONO further teaches that the predictor extracts higher frequency subbands corresponding to the first-level decomposition of an analysis wavelet filter bank ("subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband", column 6, lines 35-37).

17. Regarding **claim 33**, ONO teaches an encoding system for processing data signals comprising:

an encoder including:

a multi-level analysis filter bank for decorrelating an input data signal (see FIG. 14, a filter bank for wavelet conversion);

a plurality of decimators for down sampling a the decorrelated signal (see FIG. 14, column 1, lines 51-53, the down arrows down sample the data);

a quantizer (see FIG. 2, step 5-4) for processing only the subbands from the second and higher levels of wavelet decomposition ("subband coefficient predicting

unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband", column 6, lines 35-37);

a coder (see FIG. 2, step 5-5) for compressing only the subbands from the second and higher levels of wavelet decomposition ("subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband", column 6, lines 35-37);

However, ONO does not specifically disclose a decoding system. An official notice is taken (see MPEP 2144.03) that it is well-known in the art to decode a signal by performing the opposite steps used to encode the signal, wherein the decoder includes:

an inverse coder for decompressing received compressed subbands (see FIG. 2, step 5-5, coding mirrors an inverse coder);

an inverse quantizer for further decompressing the decompressed subbands (see FIG. 2, step 5-4, quantizing mirrors an inverse quantizer);

a plurality of interpolators for upsampling the further de-compressed subbands (see FIG. 14, column 1, lines 51-53, the down arrows down sample the data which mirrors a plurality of interpolators);

a multi-level synthesis filter bank for performing an inverse wavelet transformation filter bank on the upsampled subbands (see FIG. 14, a filter bank for wavelet conversion mirrors an inverse wavelet filter bank); and

a predictor for extracting the subbands from the first level decomposition that were not transmitted based on data of their spatially correlated subbands from other levels of decomposition ("subband coefficient predicting unit 404 predicts a

coefficient of a subband which is higher than a low-frequency subband", column 6, lines 35-37).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify ONO to decode the signal by reversing the steps used to encode the signal in order to obtain decoded data.

18. **Claims 8-19, 28, 31, and 32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono, Patent No.: US 5,883,978 ("ONO"), in view of Vaidyanathan, *Multirate Systems And Filterbanks* ("VAIDYANATHAN").

19. Regarding **claim 8**, ONO teaches all of the claimed limitations of claim 4.

However, ONO does not disclose that full decimation is performed after a predictor to minimize spatial location variance introduced by decimation.

In the same field of multirate systems, VAIDYANATHAN teaches that full decimation is performed after a predictor to minimize spatial location variance introduced by decimation (see VAIDYANATHAN, p. 119, FIG. 4.2-3, Identity 1, decimation is performed after a rational function).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the decimation of ONO after a rational function as taught by VAIDYANATHAN in order to improve the implementation of the multirate system (see VAIDYANATHAN, p. 119).

20. Regarding **claim 9**, ONO teaches all of the claimed limitations of claim 4.

However, ONO does not disclose that partial decimation is performed after both the multi-level analysis filter bank and the predictor for reducing the number of computations by the multi-level analysis filter bank and decimation.

In the same field of multirate systems, VAIDYANATHAN teaches that partial decimation is performed after both the multi-level analysis filter bank and the predictor for reducing the number of computations by the multi-level analysis filter bank and decimation (see VAIDYANATHAN, p. 140, FIG. 4.4-5(b), decimation is performed in two stages, before and after a function).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the decimation of ONO before and after a function as taught by VAIDYANATHAN in order to make the system more efficient (see VAIDYANATHAN, p. 134, section 4.4).

21. Regarding **claim 10**, ONO teaches all of the claimed limitations of claim 5.

However, ONO does not disclose that full decimation is performed after a predictor to minimize spatial location variance introduced by decimation.

In the same field of multirate systems, VAIDYANATHAN teaches that full decimation is performed after a predictor to minimize spatial location variance introduced by decimation (see VAIDYANATHAN, p. 119, FIG. 4.2-3, Identity 1, decimation is performed after a rational function).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the decimation of ONO after a rational function as taught by VAIDYANATHAN in order to improve the implementation of the multirate system (see VAIDYANATHAN, p. 119).

22. Regarding **claim 11**, ONO teaches all of the claimed limitations of claim 5.

However, ONO does not disclose that partial decimation is performed after both the multi-level analysis filter bank and the predictor for reducing the number of computations by the multi-level analysis filter bank and decimation.

In the same field of multirate systems, VAIDYANATHAN teaches that partial decimation is performed after both the multi-level analysis filter bank and the predictor for reducing the number of computations by the multi-level analysis filter bank and decimation (see VAIDYANATHAN, p. 140, FIG. 4.4-5(b), decimation is performed in two stages, before and after a function).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the decimation of ONO before and after a function as taught by VAIDYANATHAN in order to make the system more efficient (see VAIDYANATHAN, p. 134, section 4.4).

23. Regarding **claim 31**, ONO and VAIDYANATHAN teach an encoder that mirrors the decoder of claim 31. An official notice is taken (see MPEP 2144.03) that it is well-

known in the art to decode a signal by performing the opposite steps used to encode the signal, wherein the decoder comprises:

- a de-compressor including an inverse quantizer (see FIG. 2, step 5-4, quantizing mirrors an inverse quantizer) and inverse coder (see FIG. 2, step 5-5, coding mirrors an inverse coder) for expanding the compressed data signal;

- a plurality of partial interpolators for partially upsampling the de-compressed data signal prior synthesis filtering (see VAIDYANATHAN, p. 140, FIG. 4.4-5(b), decimation is performed in two stages, before and after a function, which mirrors upsampling);

- a multilevel synthesis filter bank for performing an inverse wavelet transformation filter bank on the upsampled data signal(see FIG. 14, a filter bank for wavelet conversion mirrors an inverse wavelet filter bank); and

- a predictor for extracting cross-subband correlations ("subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband", column 6, lines 35-37), and

- a plurality of partial interpolators for partially upsampling the extracted data from the predictor (see VAIDYANATHAN, p. 140, FIG. 4.4-5(b), decimation is performed in two stages, before and after a function, which mirrors upsampling).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify ONO and VAIDYANATHAN to decode the signal by reversing the steps used to encode the signal in order to obtain decoded data.

24. Regarding **claim 32**, ONO further teaches that the predictor extracts higher frequency subbands corresponding to the first-level decomposition of an analysis wavelet filter bank ("subband coefficient predicting unit 404 predicts a coefficient of a subband which is higher than a low-frequency subband", column 6, lines 35-37).

Conclusion

25. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joel Stoffregen whose telephone number is (571) 270-1454. The examiner can normally be reached on Monday - Friday, 9:00 a.m. - 6:30 p.m..


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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